

## ABSTRACT OF THE DISCLOSURE

The present invention provides a laser-based method and apparatus that uses absorption spectroscopy to detect the mole fraction of CO<sub>2</sub> in a high temperature gas stream. In a preferred embodiment, a distributed feedback based diode laser sensor operating at a wavelength near 1996.89 nm (5007.787 cm<sup>-1</sup>) interrogates the R(50) transition of the  $\nu_1+2\nu_2+\nu_3$  CO<sub>2</sub> absorption band in the near infrared. This transition is specifically chosen based on its superior linestrength and substantial isolation from interfering absorption by high-temperature H<sub>2</sub>O, CO, NH<sub>3</sub>, N<sub>2</sub>O, NO, and other species commonly present in combustion or other high-temperature gas flows.

2024-07-24 10:00